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United States Department of Agriculture (USDA)
International Operational Agriculture Monitoring Program

USDA Foreign Agricultural Service

Afghanistan: Crop Progress Report

MY 2010/11

December/ Start of Season Summary **December 28, 2009**

(1) Afghanistan has experienced very large fluctuations in foodgrain (wheat) and feedgrain (barley) production during the past two winter grain growing seasons (Marketing Years 2008/09 and 2009/10). Wheat is especially important, being the staple food grain in the country and contributing an estimated 60 percent of daily caloric intake. Wheat production has been especially volatile, declining 55 percent in MY 2008/09 owing to drought, then rising 173 percent owing to ideal moisture in MY 2009/10. The devastating crop losses which occurred in MY 2008/09 caused widespread food insecurity in the country, along with record high domestic grain prices and record wheat imports. A massive international emergency food aid program had to be initiated to overcome the shortfall in production that season, and tide sufficient numbers of the population over until grain supplies from the next crop season became available. The country's annual foodgrain production capacity is extremely reliant on the favorable timing and volume of seasonal rainfall and snowfall, making it especially vulnerable to periodic moisture deficiencies. Wheat is the primary grain crop grown in the country and accounts for 80 percent of Afghanistan's total annual grain production. About 55 percent of the nation's wheat acreage is totally reliant on rainfall, with the remainder being irrigated from mountain snowmelt. The fate of the annual winter grain harvest, therefore, directly determines the food security situation in the country. The new MY 2010/11 winter grain planting season is now largely complete, with the vast majority of the grain crops sown between October and December.

(2) The current outlook for national winter grain production is uncertain at this early stage, and will be dependent on beneficial winter and spring precipitation as well as an elongated period of gradual snowmelt to supply the irrigated lands with sufficient seasonal moisture. It should be noted that an early and rapid melt of the snowpack in MY 2008/09 led to significantly reduced supplies of irrigation water for wheat crops when they needed it most, and exacerbated crop losses during the nationwide drought. Therefore, either insufficient rainfall or an untimely snowmelt has the potential to cripple crop production prospects in Afghanistan. Approximately 1.1 million hectares or 45 percent of the country's wheat acreage is irrigated, and under normal conditions contributes about 70 percent of total national wheat production (Figure 1). An estimated 88 percent of the country's irrigation supplies comes from surface water flowing through a series of regional rivers and canals (Figure 2), fed by and dependant on the timing and rate of snowmelt from the high mountains of the Hindu Kush. Given Afghanistan's arid climate and extremely mountainous terrain, arable land is sparse and widely scattered throughout the country. Wheat is commonly cultivated on very small acreages, averaging 1.5 (irrigated) to 6.0 (rainfed) hectares in size, with the vast majority of the crop grown in the northern half of the country. The wheat crop

calendar, or annual growing period, varies by region and altitude, being particularly dependent on local climatic variations such as available precipitation, timing of winter frosts, and first snowfall (Figure 3). In general, the October through December period is the primary planting window for winter crops such as wheat. Visual evidence of crop emergence and vegetative development via satellite imagery usually does not occur until late February or early March, and wheat fields reach their peak vegetation from April to May. The higher elevation rainfed cropping regions typically have later growing seasons, with peak crop vegetation occurring in June (Figure 4). Crop maturation and harvest activities typically occur from May to July. In Afghanistan an estimated 80% of average annual precipitation is in the form of snow cover originating in the Hindu Kush mountain range[1]. As such, the highest overall precipitation occurs in the central and northeast highlands, with limited precipitation falling in the arid southwestern provinces. Average monthly precipitation is highest during the months of December through May, which corresponds with the winter wheat growing season (Figure 5).

Winter Wheat – Last Season

(3) Last year Afghanistan achieved a bumper national wheat harvest, recording the highest production level in the past 50 years – in fact, since the beginning of USDA records in 1960 (Figures 6 and 7). Several factors played a role in generating the record wheat harvest, with ideal rainfall distribution and record wheat acreage being the major contributors. Farmers expanded acreage last year to historical highs, in reaction to record high 2008 domestic foodgrain prices. By sheer coincidence, the weather pattern proved especially favorable, delivering copious rains to thirsty crops throughout the major producing regions. Both rainfed and irrigated wheat crops had sufficient moisture during peak growth and development phases, ensuring that record crop yields and a bumper harvest ensued. This was especially the case in the north, northwest, and northeast regions where historically almost 70 percent of the country's winter wheat crop is produced (Figure 8). Precipitation during the MY 2009/10 grain season was extremely well-distributed, with a better than average snowpack in the northeast ensuring adequate irrigation supplies (Figure 9). Satellite vegetation index data (NDVI) time series charts covering the past six growing seasons highlight the recent swings in grain productivity, clearly showing the drought affects in MY 2008/09 (severely reduced vegetation) and the remarkable record crop conditions in MY 2009/10 in both rainfed and irrigated growing regions (Figure 10).

Winter Wheat – Current Season

(4) As the MY 2010/11 winter grain planting season comes to a close, Afghanistan has had the most favorable autumn rainfall conditions in years (Figure 11). This has enabled farmers in most regions to plant their crops in a timely manner and for soils to build up modest amounts of soil moisture for seed germination and early growth once soil temperatures are suitably warm. The main exceptions are the majority of the West Central region and portions of the North region, where deficient moisture is currently a problem. These relatively high altitude wheat producing areas are likely to benefit from heavy snows during the winter months, and

[1] Food and Agriculture Organization, "Promotion of Agricultural Rehabilitation and Development Programs in Afghanistan: Water Resources and Irrigation" (Islamabad: FA) 1996).

thus the current shortfall is not yet critical. Season-to-date rainfall has been better than normal across almost all irrigated and rainfed agricultural lands, with the exception of some rainfed districts in the north and the primarily irrigated west central region (Figure 12). December also marked the first major rainfall event in the Helmand river basin of the Southwest region after an extensive two-year drought. Although the precipitation levels were not excessive, the rainfall accumulations are currently well above normal for the region. Temperatures across the country have also been well above normal over the past two months, increasing the potential for evaporative loss of moisture (evapotranspiration) from farm lands. However the prevailing above-normal rainfall pattern over much of the country has overcompensated for this, and led to a favorable increase in surface soil moisture levels that are currently near ideal in many regions (Figure 13).

(5) Satellite-derived vegetation index (NDVI) analysis, comparing the current season against last year and the 6-year average shows that current crop conditions are slightly more favorable over the northern half of the country. However it is too early in the crop season to make any production-related judgments from this data (Figure 14). A trend worth noting is the slight increase in green vegetation compared to last year in the northwest, north and northeast agricultural regions (Figures 15 and 16), which account for the bulk of rainfed wheat production and are collectively responsible for almost 70% of national wheat output. Record crop production from these regions was largely responsible for the bumper wheat harvest last year (MY 2009/10) and the current favorable growing conditions (excellent rainfall, warm temperatures) are an encouraging early sign in the new MY 2010/11 growing season.

(6) Much of the surface water that flows through Afghanistan's river basins is generated from spring snow melt out of the Hindu Kush Mountains. Given this is the source of the vast majority of the country's seasonal irrigation supplies, it is important to monitor yearly snow accumulation throughout the season. Current snow pack as of mid-December 2009 was slightly lower than normal in depth but near-normal in areal coverage (Figure 17). The highest amount of snowfall has occurred in the north eastern mountains along the Northern Pakistan and Tajikistan borders, and in the Torkestan Mountains in Badghis and Ghowr provinces in the northwest. Elsewhere, the slightly lower than normal snow pack is likely a result of seasonably high temperatures which have predominated throughout the country during the past two months. Overall snow accumulation in Afghanistan is progressing as expected; it is still early in the winter season with the snow pack generally reaching its peak between mid-February and early March.

(7) The NOAA Climate Prediction Center's 7-day rainfall forecast calls for substantial additional rain through most of the country. Of notable importance is the high expected rainfall in the west central and north agricultural regions where lower than average precipitation has occurred to date (Figure 16). This rainfall, should it occur, would largely reverse the existing shortages in those dry regions.

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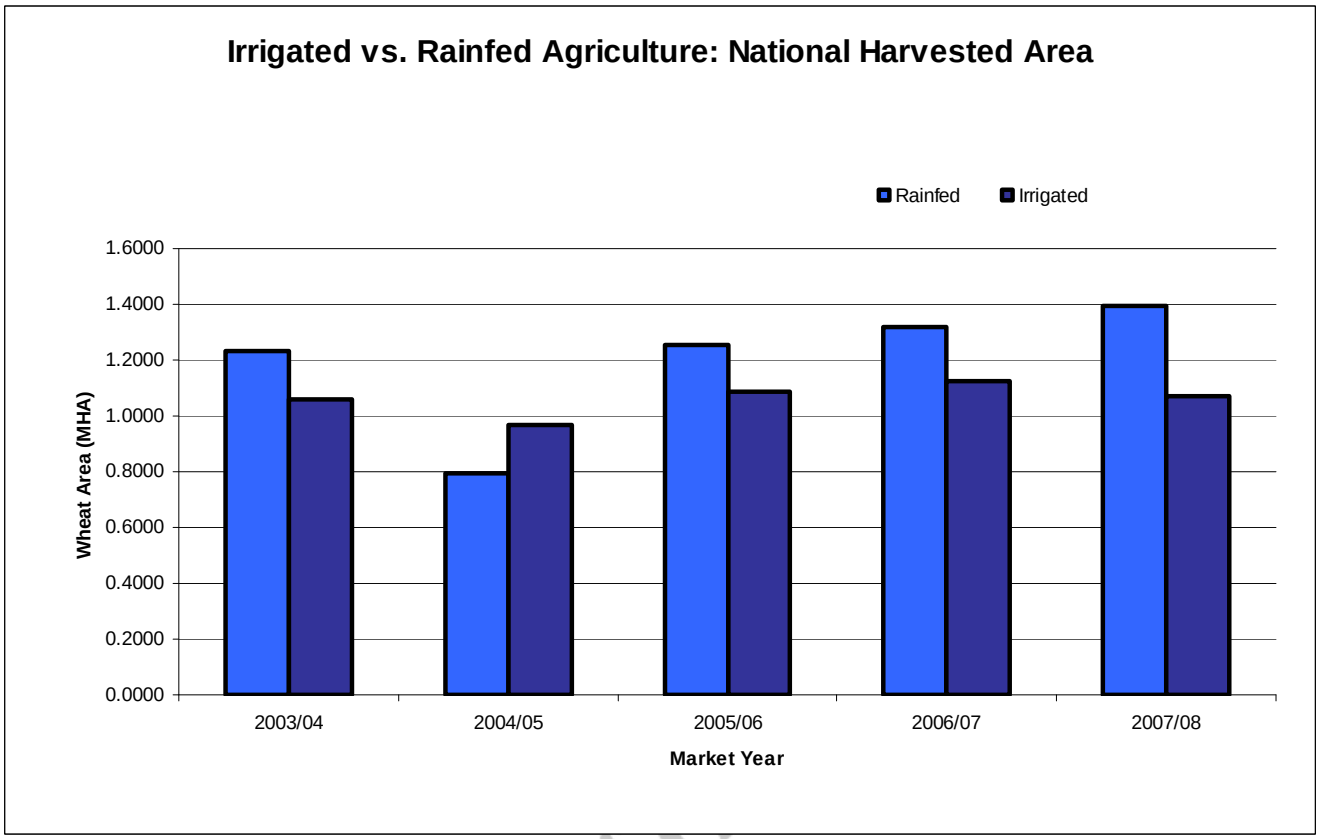

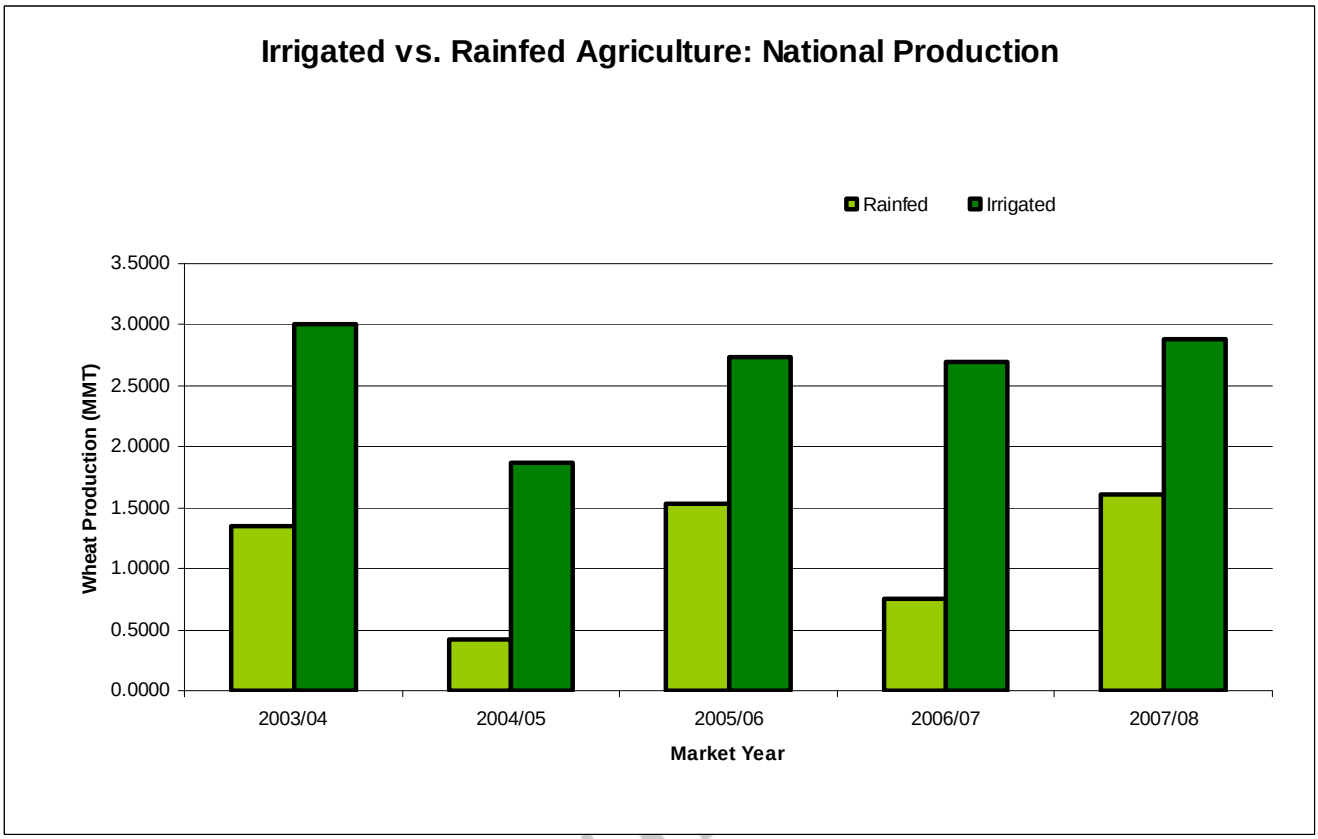

Figure 1. Historical crop area and production from rainfed and irrigated sources 2003 to 2007.

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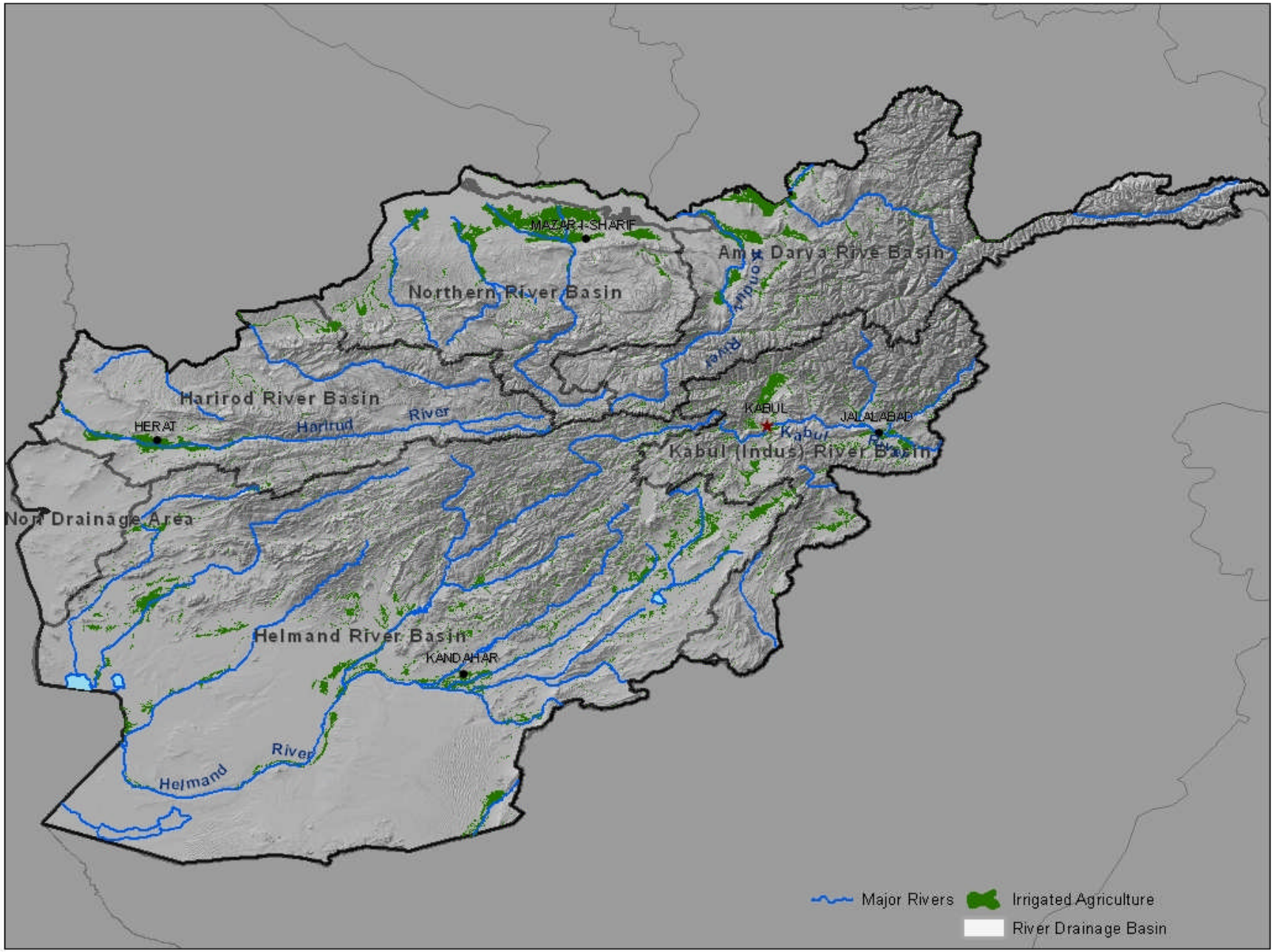

Figure 2. Location of irrigated agriculture in Afghanistan and major river systems.

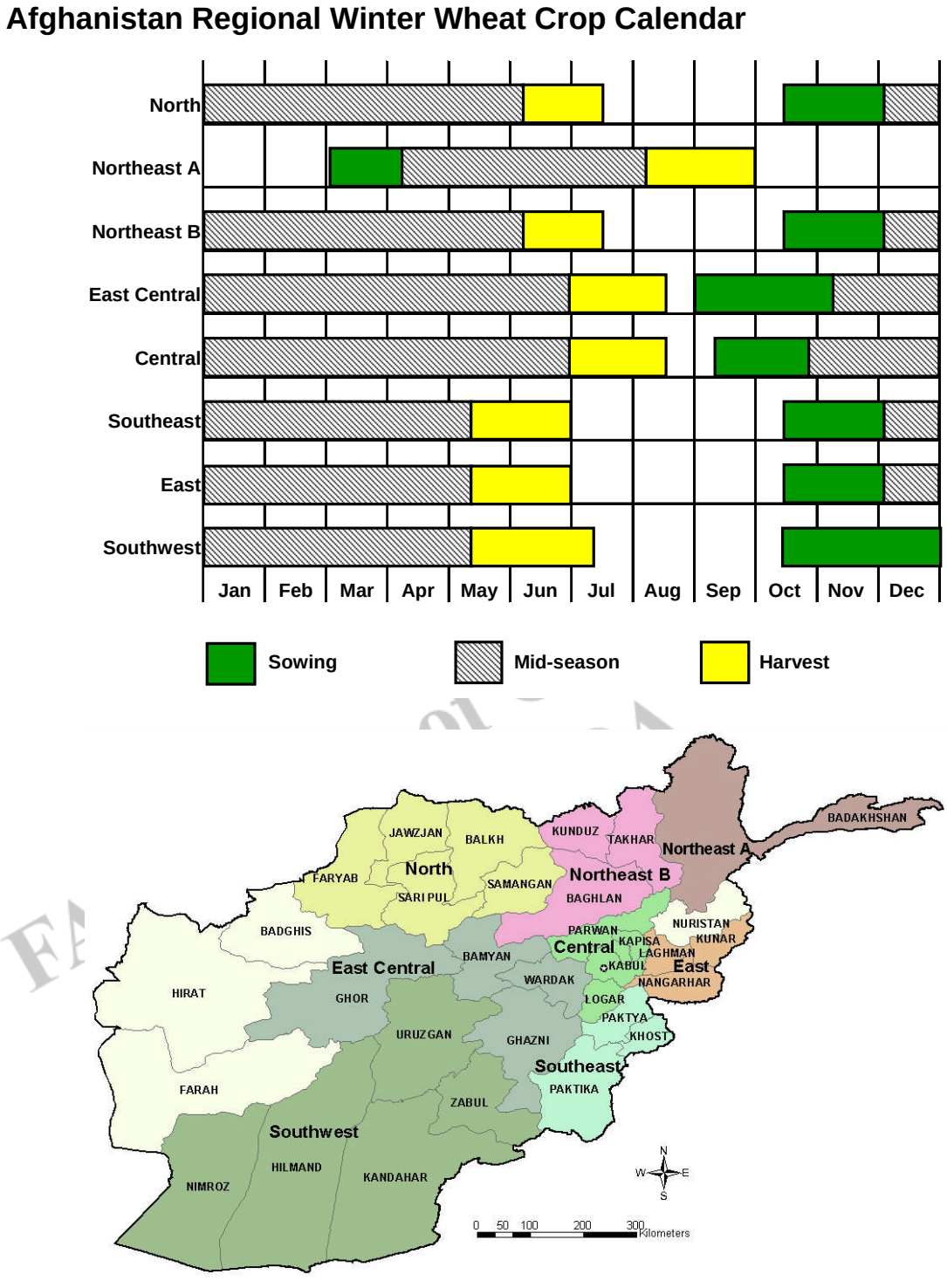

Figure 3. Regional crop calendar for winter wheat in Afghanistan and reference map. Source: FEWS NET Afghanistan, USAID.

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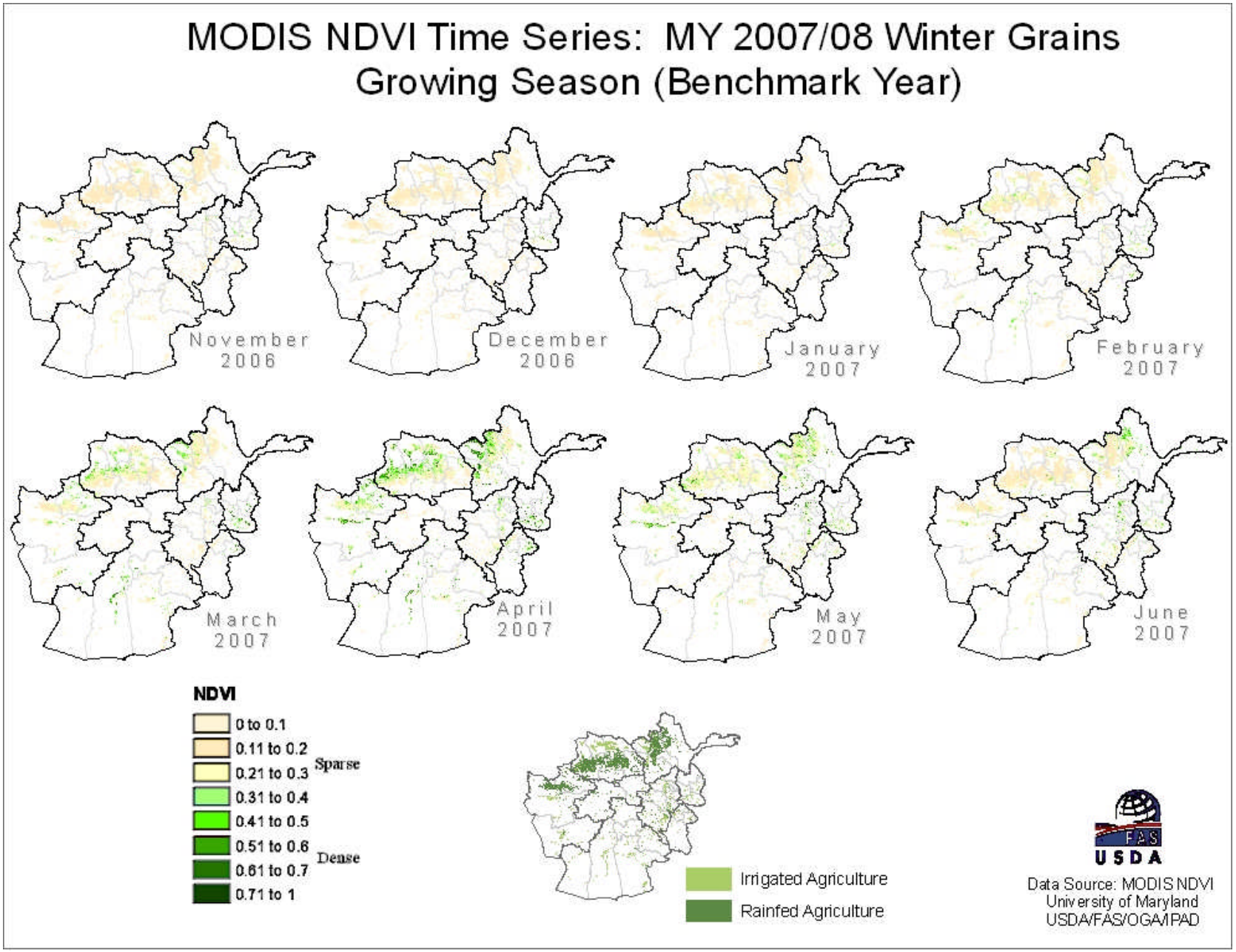

Figure 4. Vegetation growth through the winter wheat growing season.

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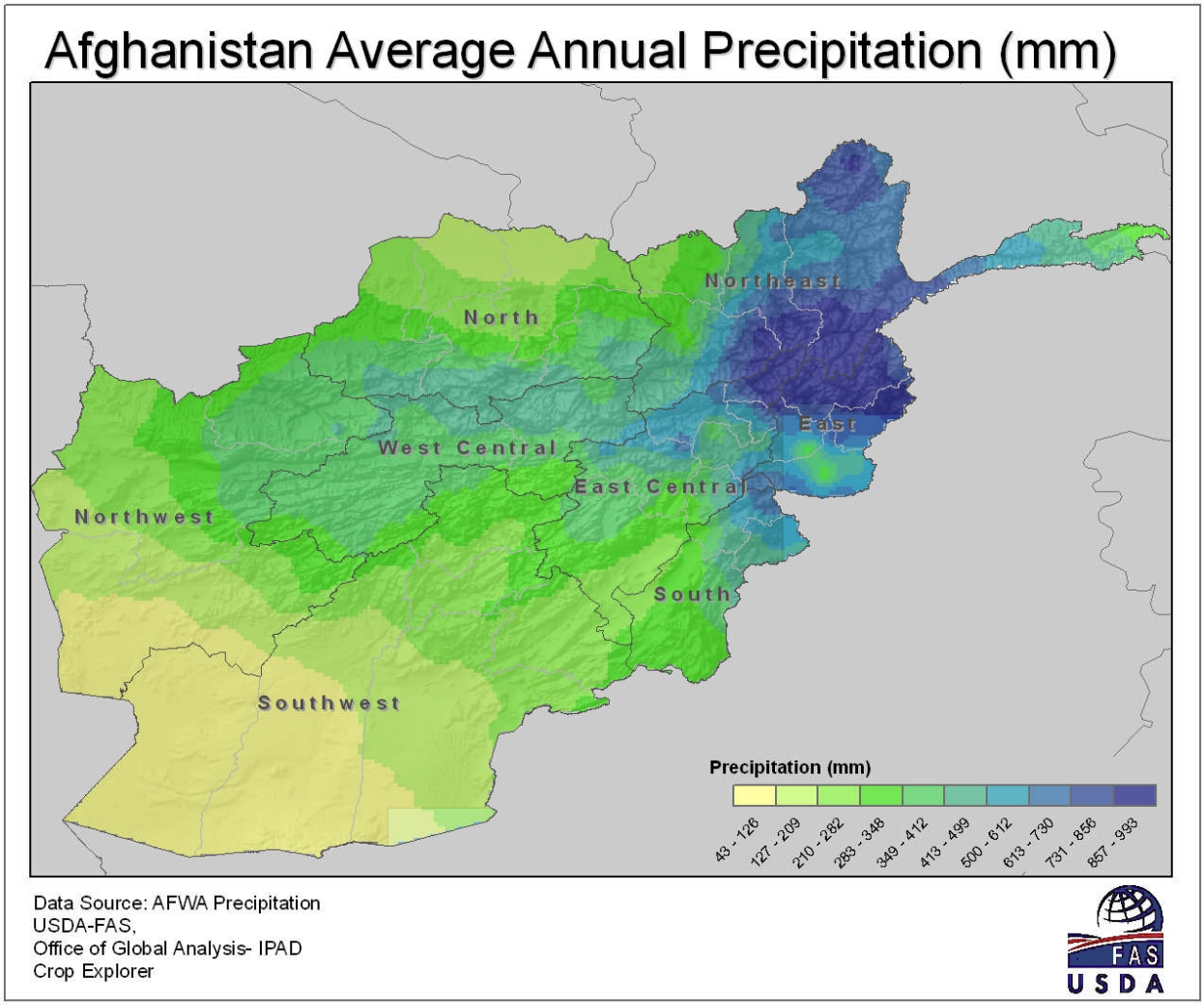

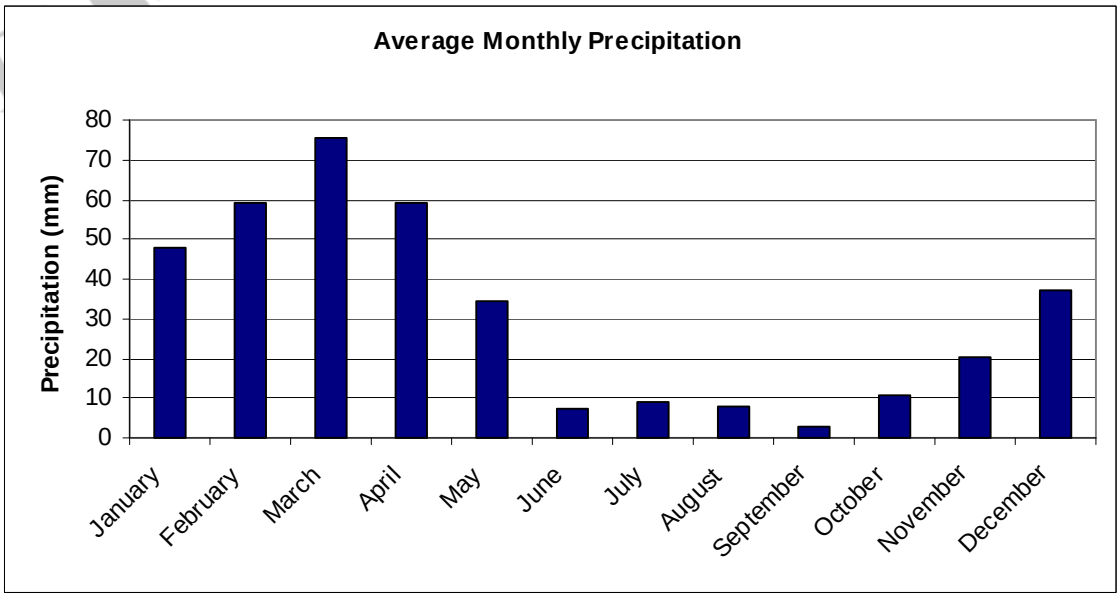

Figure 5. Average annual cumulative precipitation and bar graph of average national precipitation by month.

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Commodity	Attribute	Country	MY 2000/01	MY 2001/02	MY 2002/03	MY 2003/04	MY 2004/05	MY 2005/06	MY 2006/07	MY 2007/08	MY 2008/09	MY 2009/10
Wheat	Area (1000 HA)	Afghanistan	2,029	1,779	1,742	2,320	1,766	2,349	2,190	2,200	1,600	2,500
	Yield (MT/HA)	Afghanistan	0.72	0.90	1.54	1.53	1.30	1.49	1.42	1.52	0.94	1.64
	Production (1000 MT)	Afghanistan	1.469	1.597	2.686	3.55	2.293	3.5	3.1	3.35	1.5	4.1

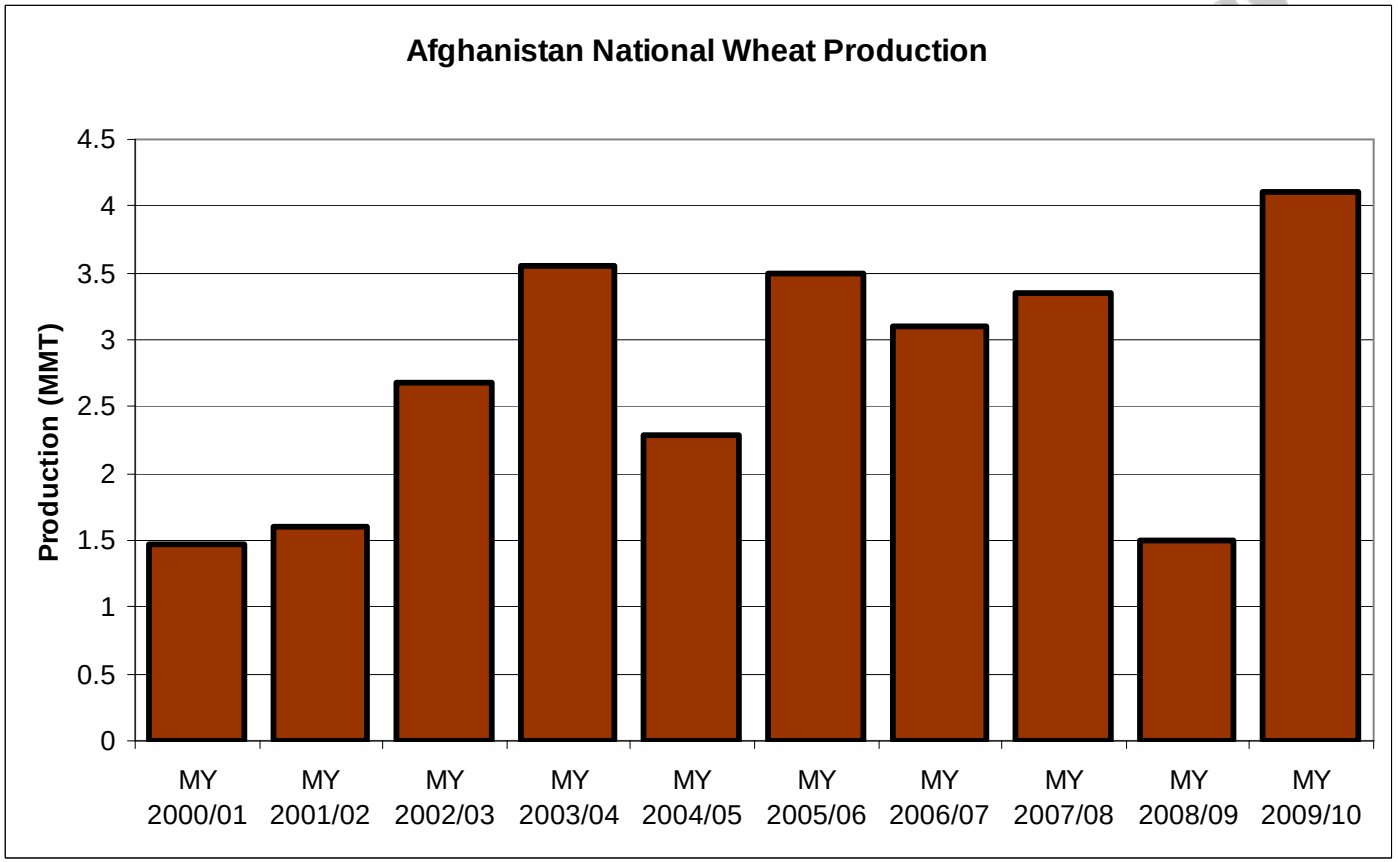

Figure 6. National wheat production statistics previous 10 crop seasons.

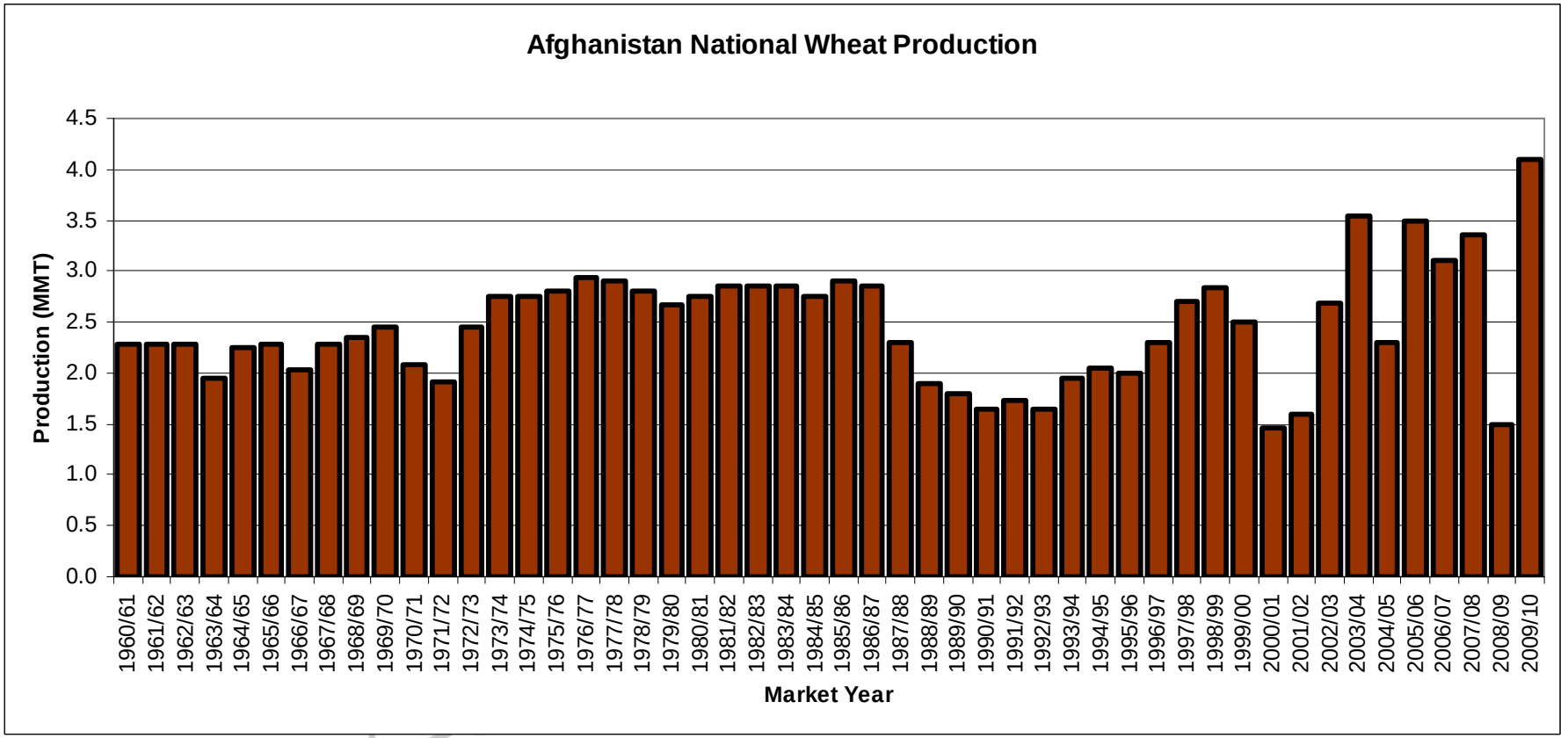

Figure 7. National Wheat production in million metric tons – 1960 to 2009.

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Percent of National Wheat Production by Agricultural Region

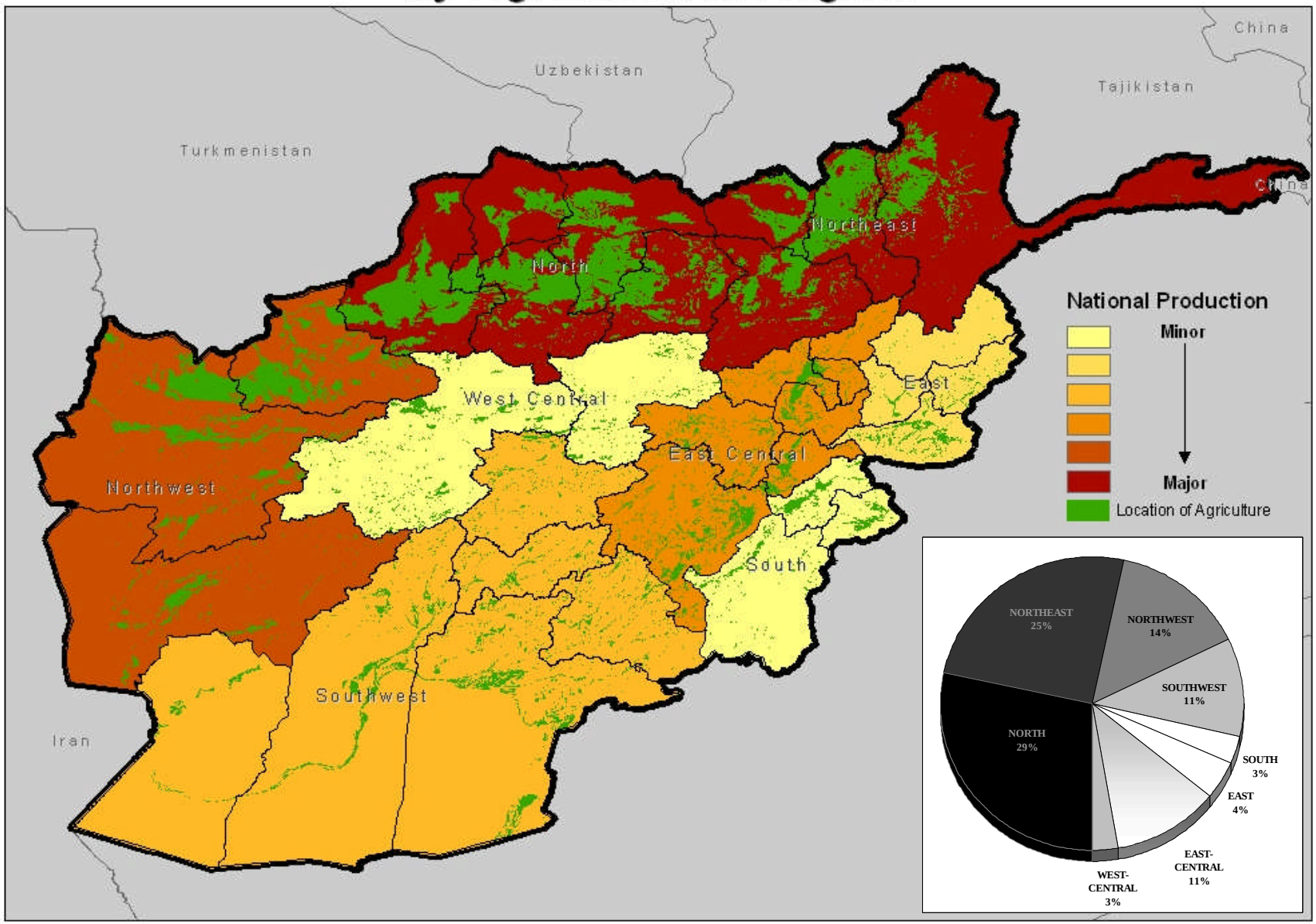

Figure 8. Percent of national wheat production broken down by agricultural region.

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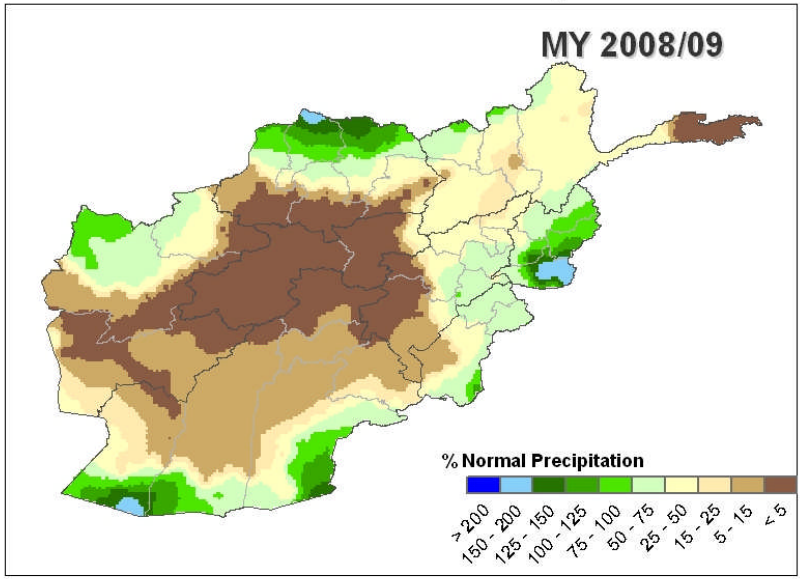
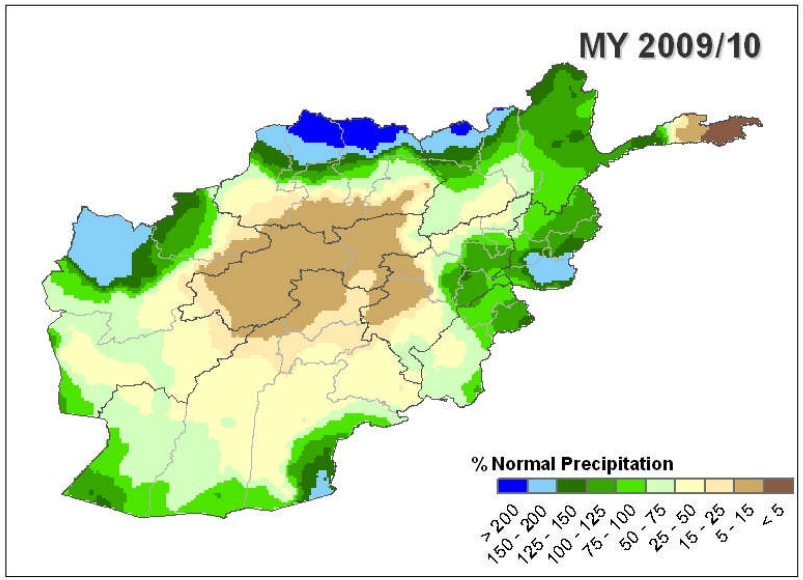
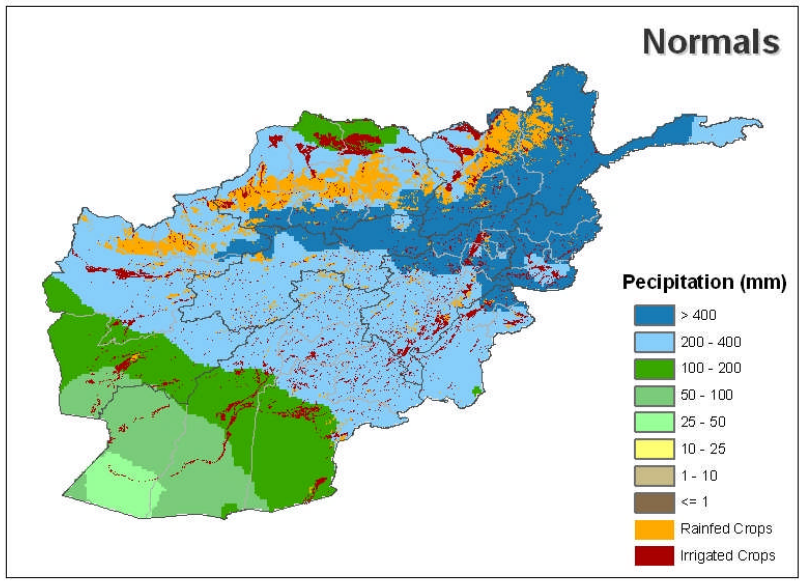
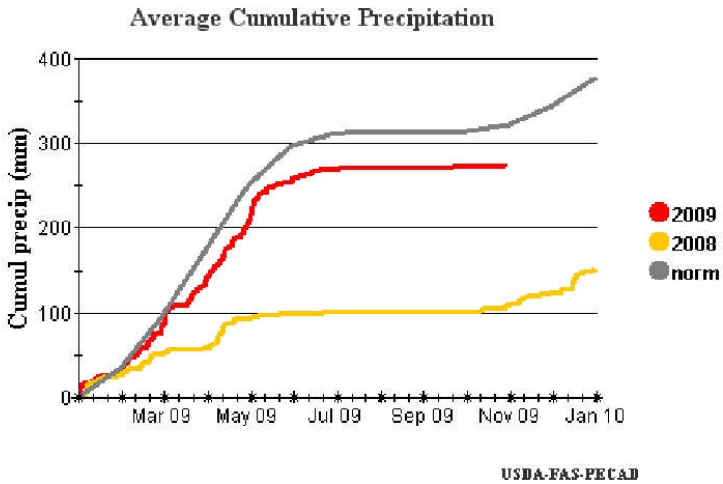
Percent of Normal Precipitation: Previous Two Winter Grains Seasons









Data Source: USDA/FAS
Office of Global Analysis

FAS
USDA

Figure 9. Cumulative percent of normal rainfall during prior two wheat seasons highlighting the 2008 drought year and 2009 bumper crop year.

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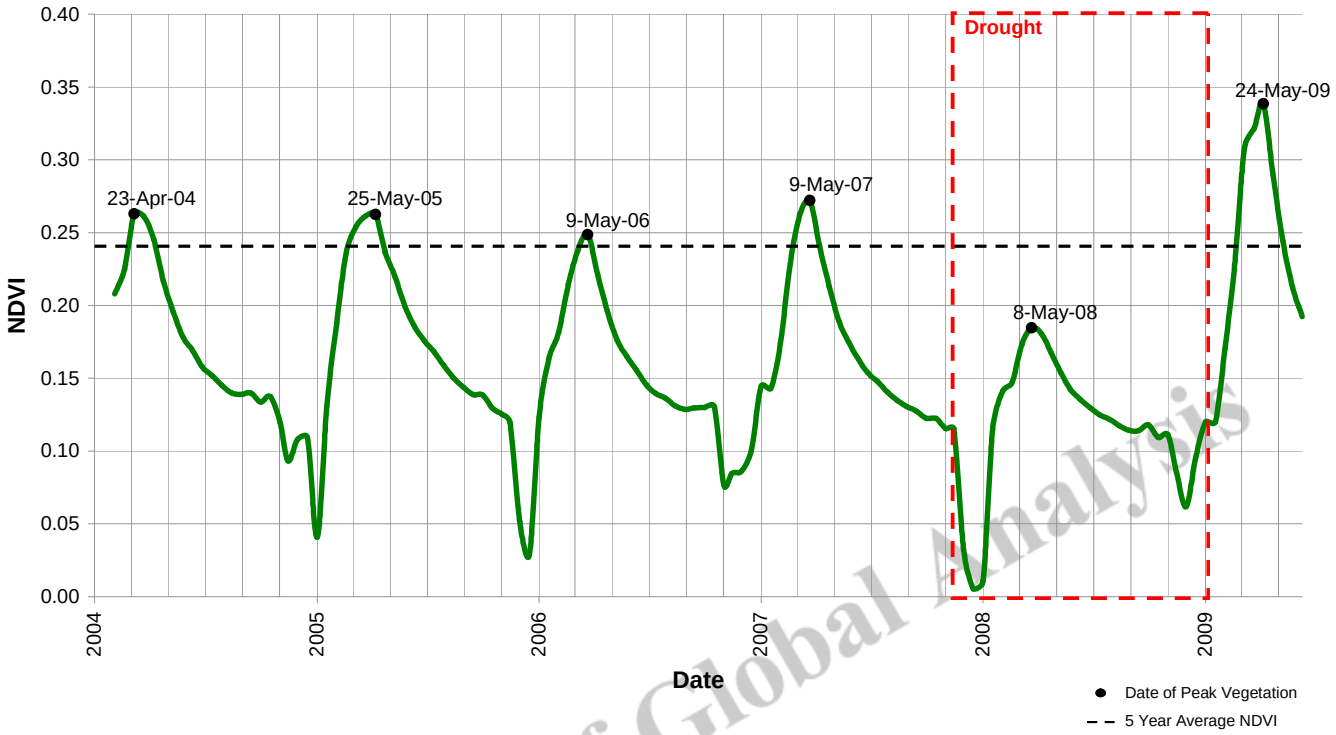
Afghanistan Rainfed Agriculture NDVI Time Series



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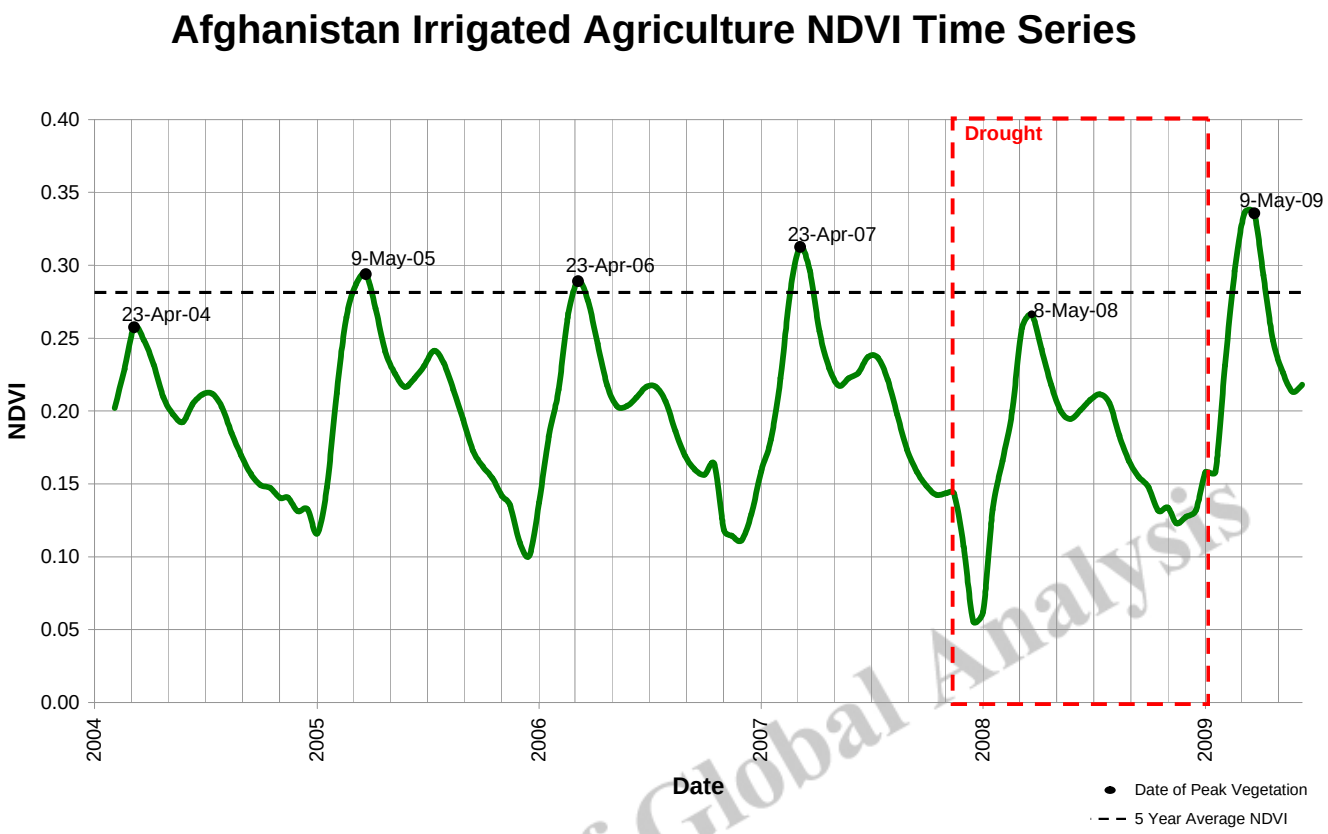

Figure 10. NDVI time series over irrigated and rainfed agricultural areas 2004 to 2009, highlighting 2008 drought season.

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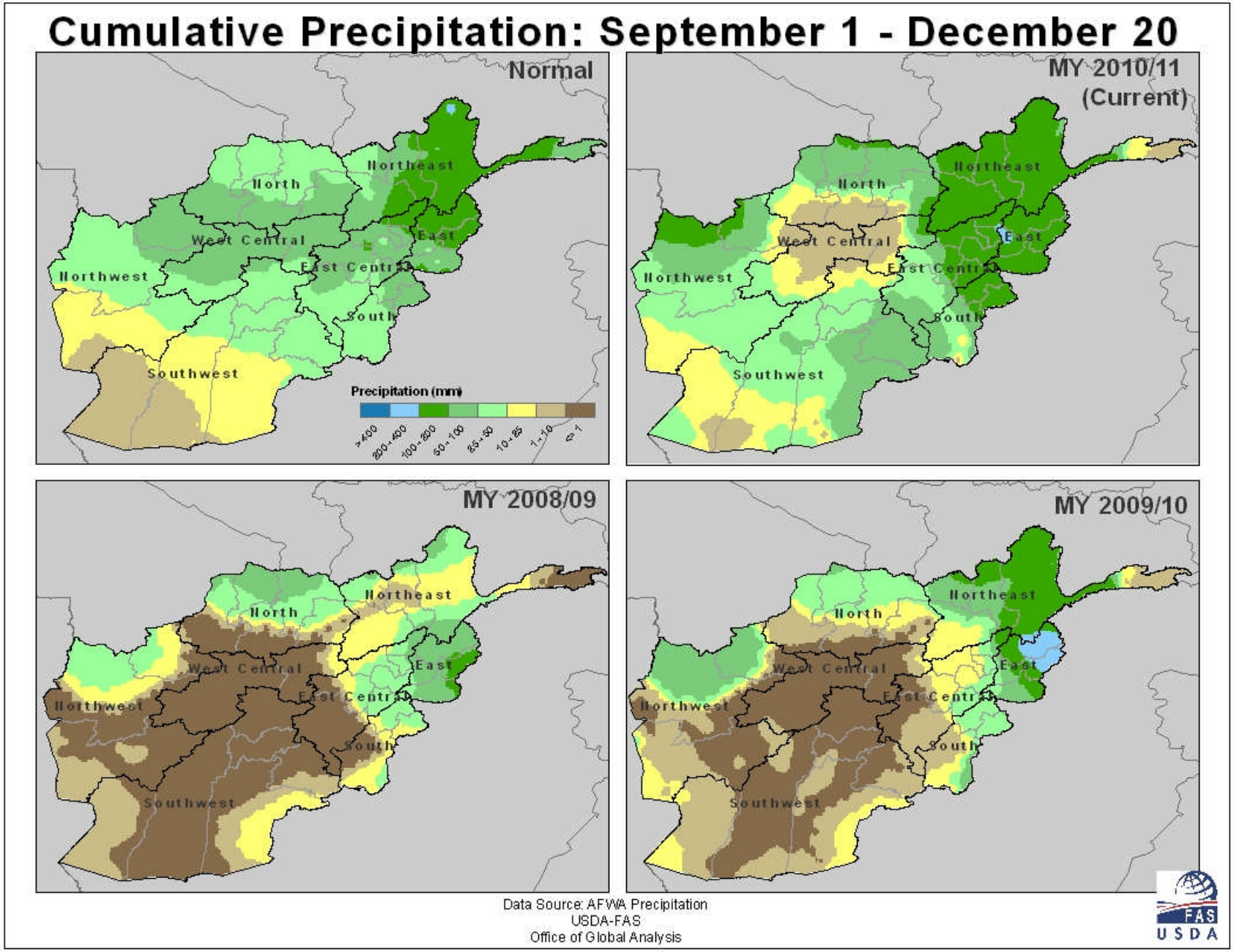

Figure 11. Season to date cumulative precipitation September 1 to December 20, current year compared against previous two crop seasons.

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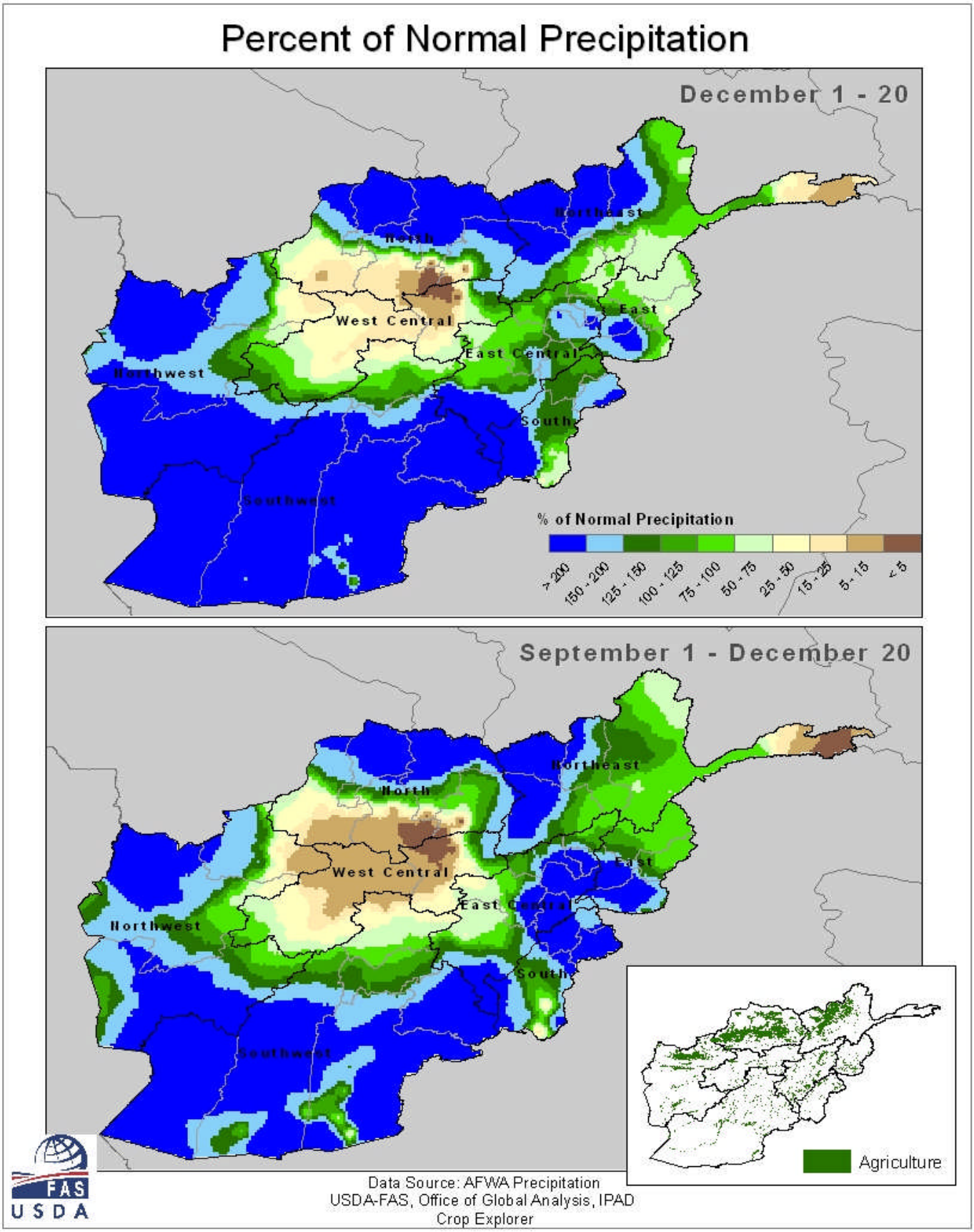

Figure 12. Percent of normal precipitation month to date and season to date over Afghanistan.

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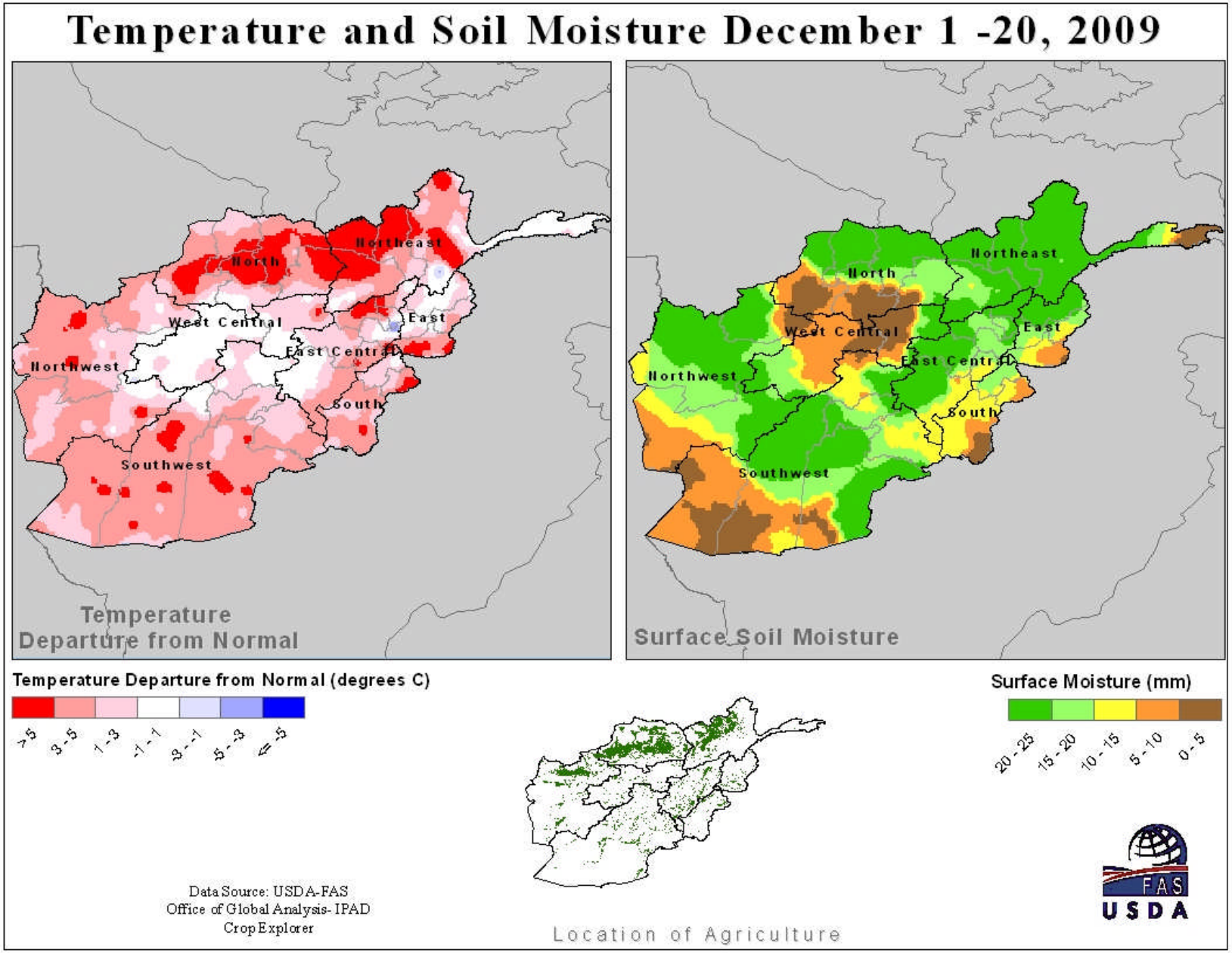

Figure 13. Afghanistan temperature departures from normal for the first two decades of November, 2009 (MY 2010/11) and surface soil moisture, a function of evapotranspiration and precipitation. 10-mm or less surface moisture will not support seed germination or early growth potentials for a recently emerged crop.

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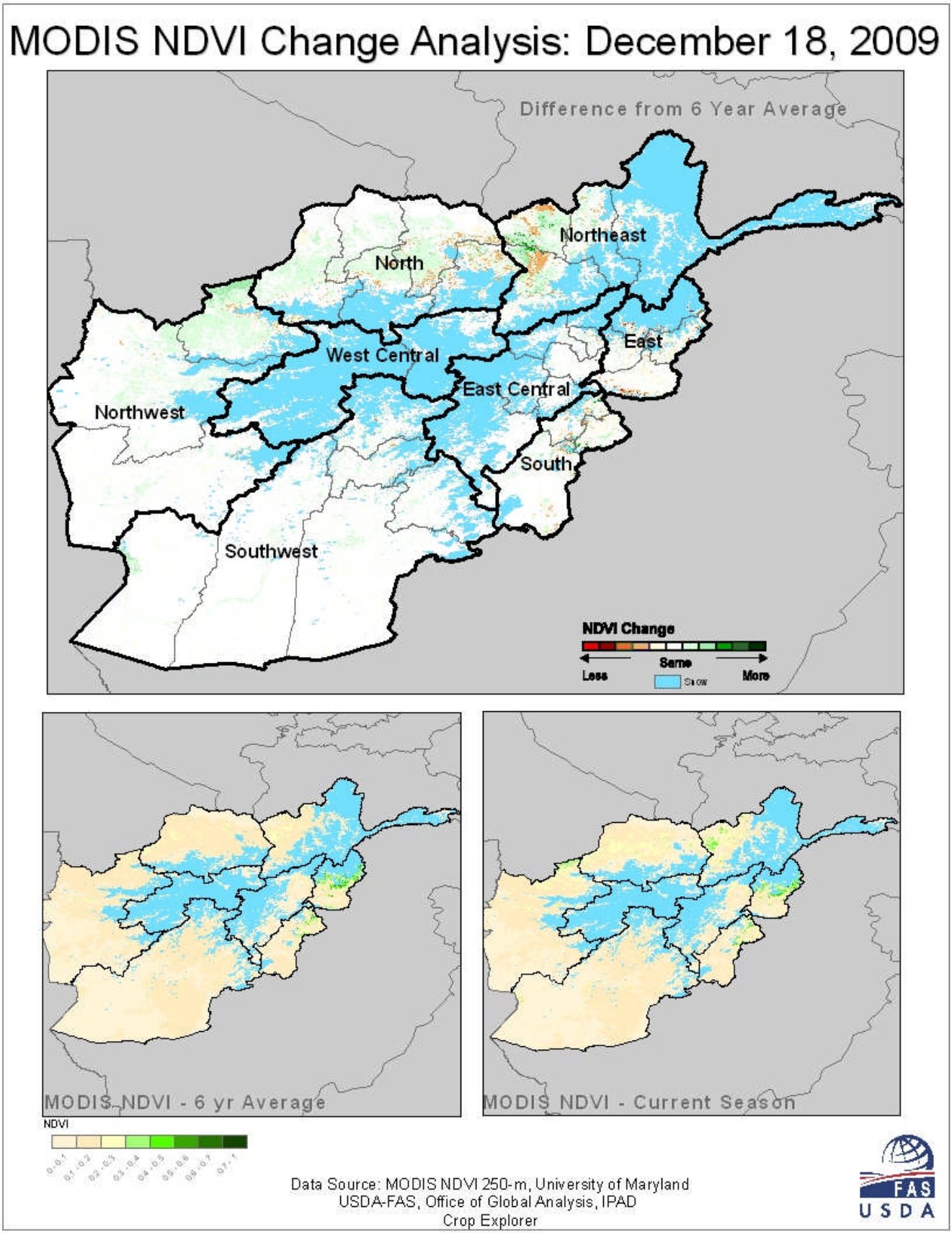

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Figure 14. NDVI comparison, current status of agricultural field green vegetation (MY 2010/11) compared against previous 6-years average.

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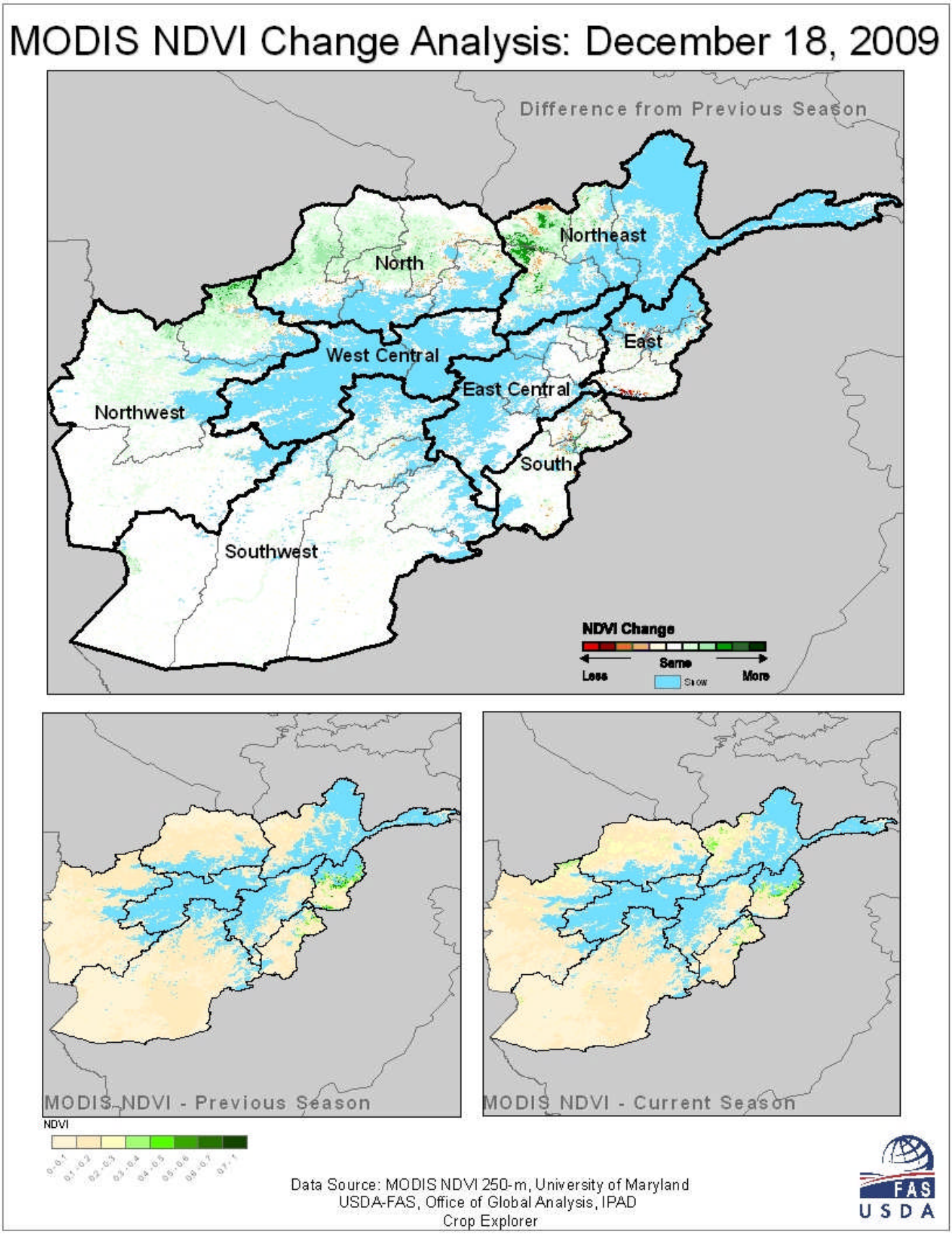

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Figure 15. NDVI comparison, current status of agricultural field green vegetation (MY 2010/11) compared against previous year (MY 2009/10).

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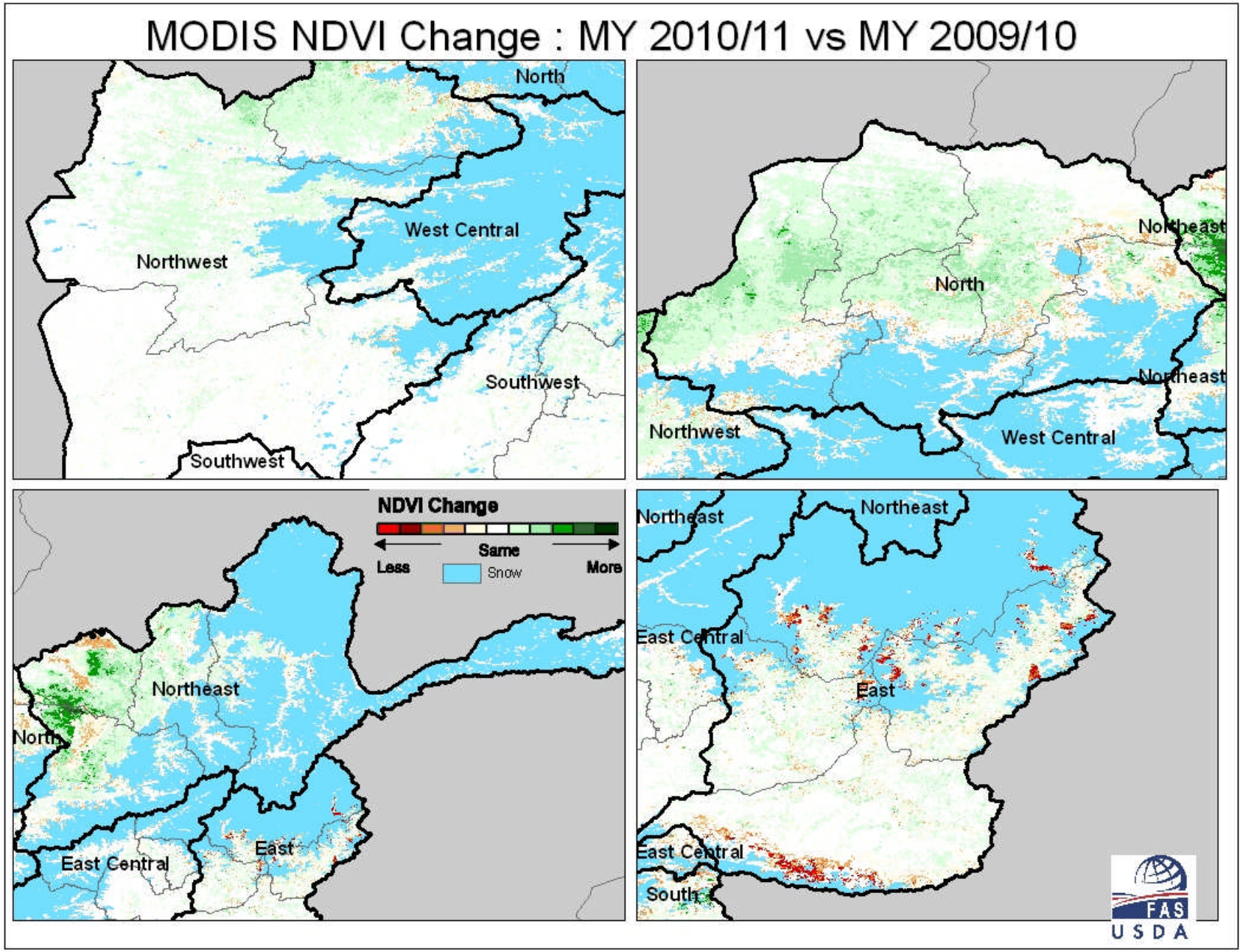

Figure 16. NDVI comparison, current status of agricultural field green vegetation (MY 2010/11) compared against previous year (MY 2009/10).

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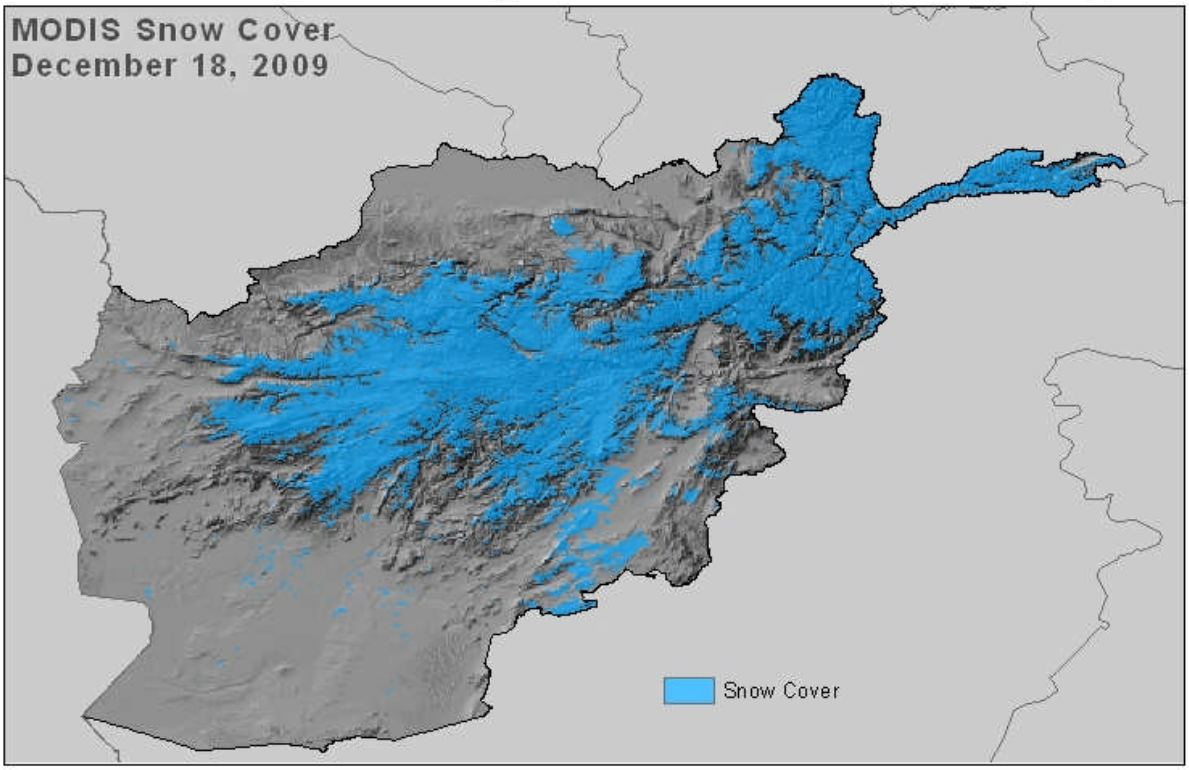
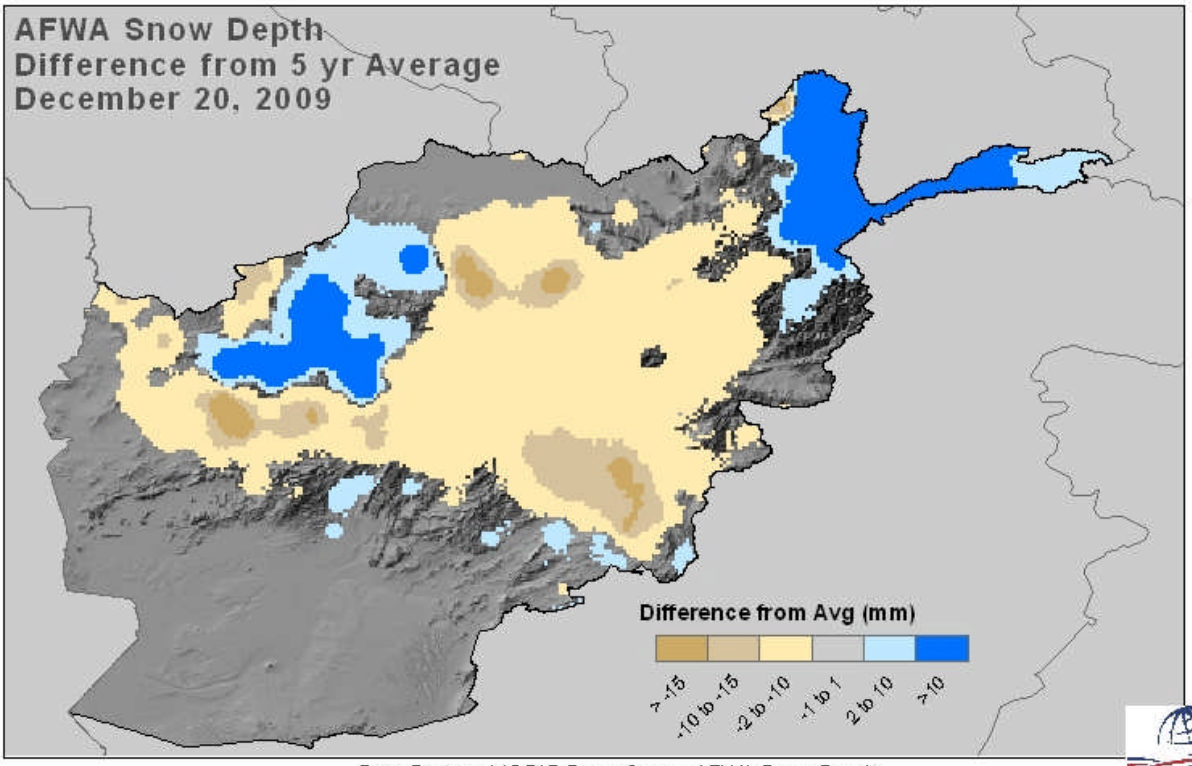
Snow Cover and Depth Difference from Average





Data Source: MODIS Snow Cover; AFWA Snow Depth
NASA, National Snow and Ice Data Center
USDA-FAS, Office of Global Analysis, IPAD

FAS USDA

Figure 17. Location of current snow cover and snow depth difference from average. *Note: the disparity in area and location between the snow cover and snow depth products is a function of sensor resolution from which the data are derived.*

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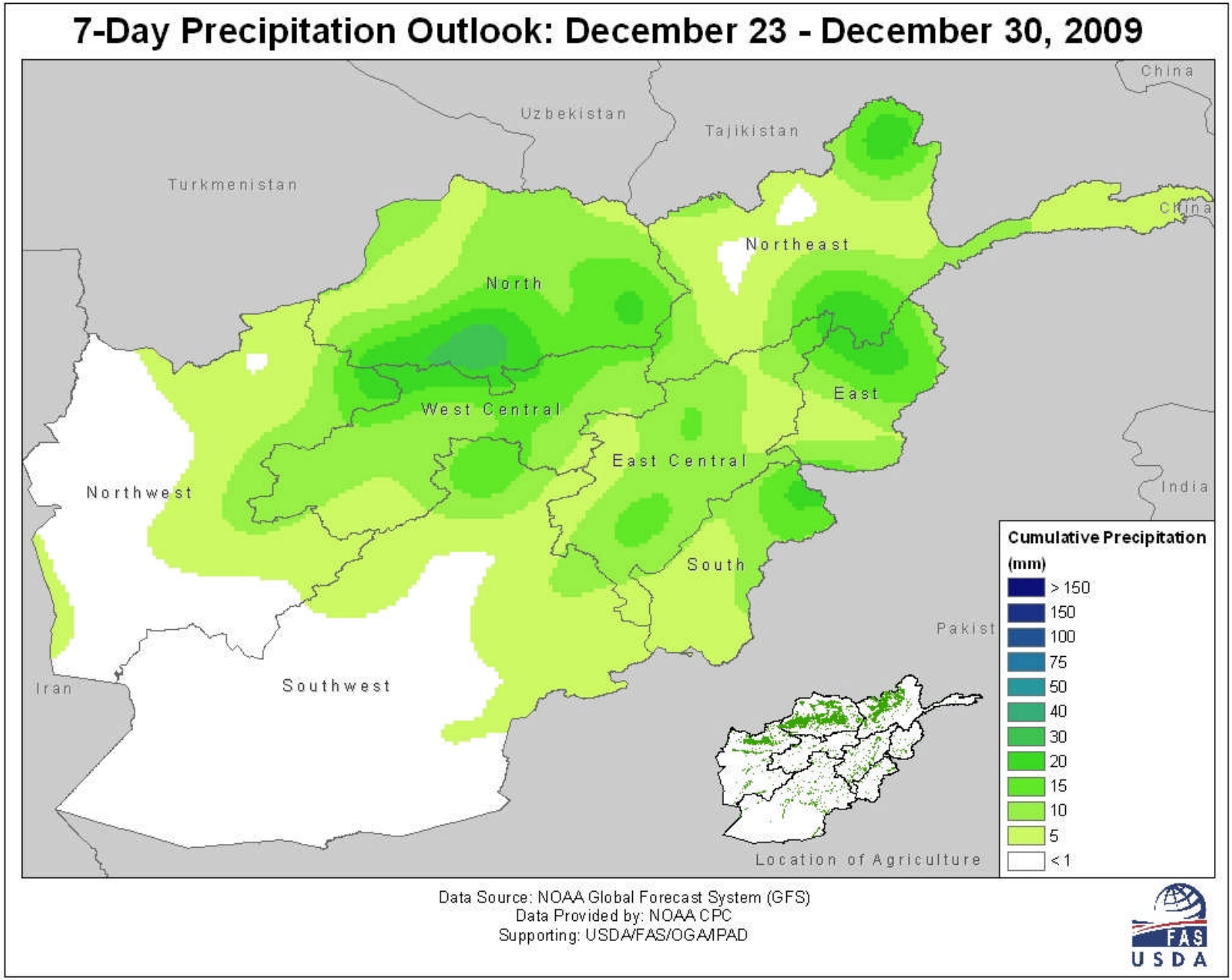

Figure 18. NOAA CPC 7-day precipitation forecast over Afghanistan. Predicting cumulative precipitation from December 23 to December 30, 2009.

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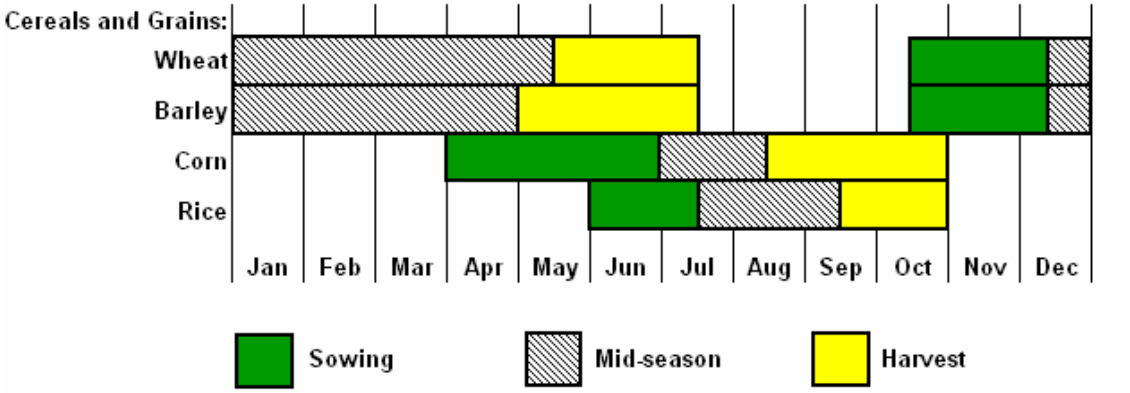
APPENDIX

Afghanistan Crop Calendar



* Calendar represents major production regions. Earlier planting expected in the central highlands.

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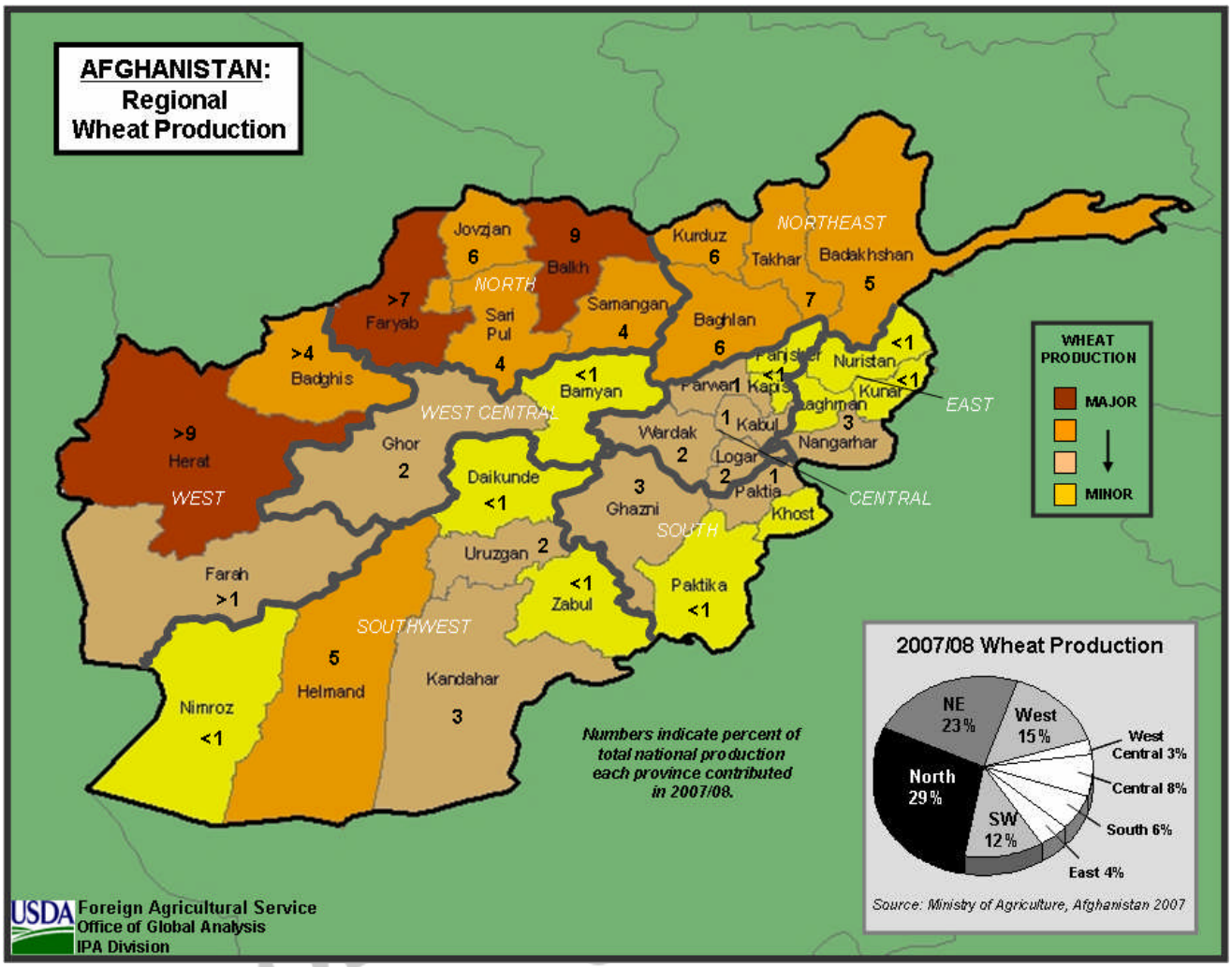

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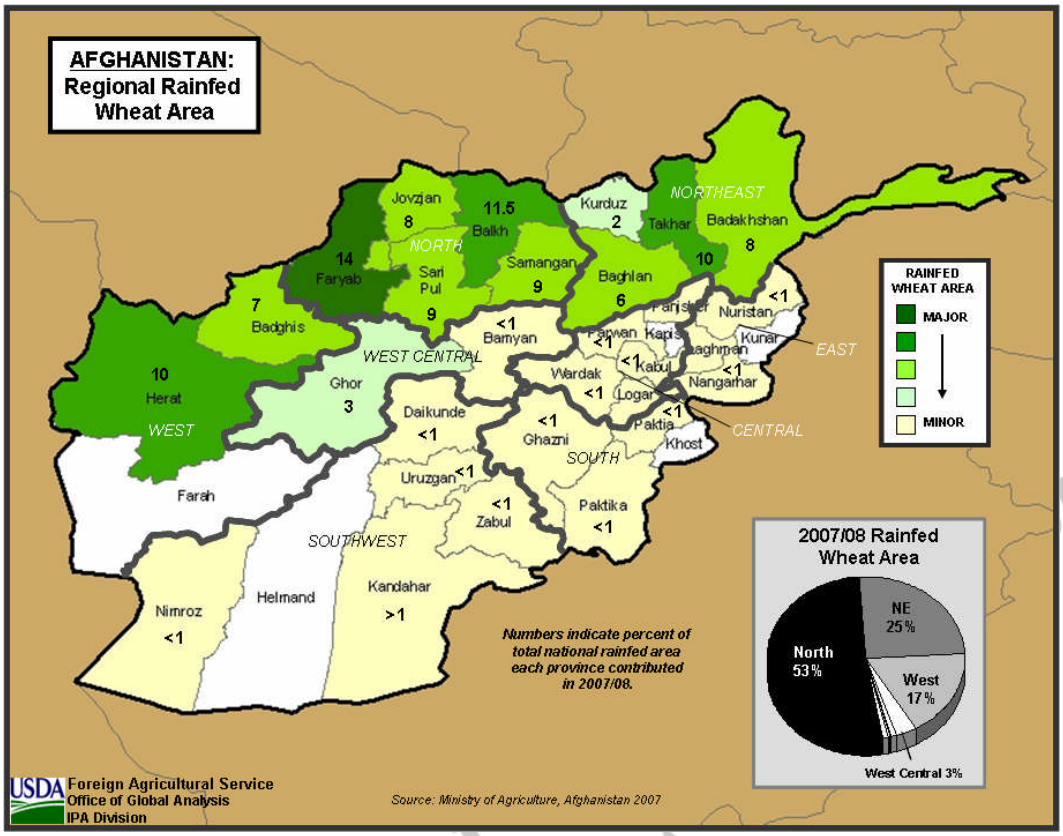

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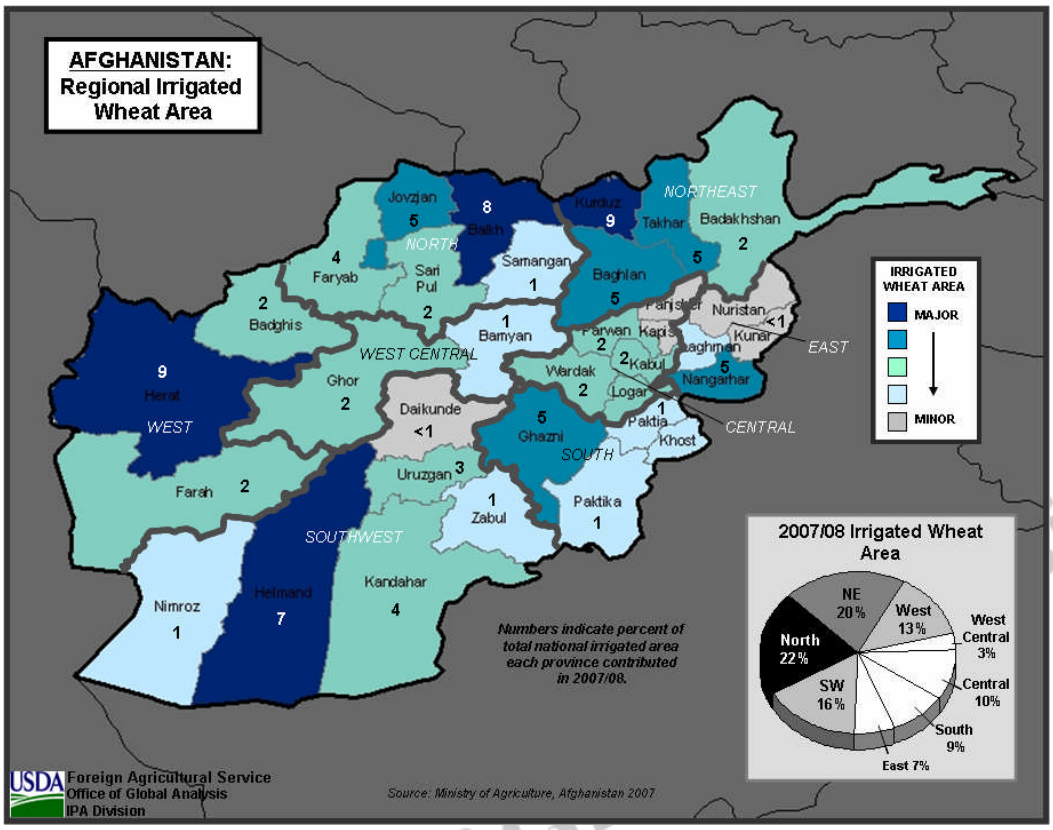

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